



# national accelerator laboratory

TM-477  
2254

## UPGRADING THE M6 BEAM LINE FOR 280 GeV OPERATION

G. A. Weitsch

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The M6 beam line in the Meson Area is designed both for high intensities (2.5 mr production angle) and for high momentum resolution ( $\pm 0.03\%$ ). The basic design was made at a time when 200 GeV protons were expected at the Meson Area target; hence, the maximum of 200 GeV for the M6 line. Since then, 300 GeV operation has become standard for the Meson Area and the other charged particle beam lines M1 and M2 were upgraded correspondingly. The neutral beam lines, M3 and M4, did not require any changes, leaving only the highest quality beam, M6, limited to 200 GeV. Improving M6 for higher energy is made difficult and complicated by the already quite high density of components needed to achieve the high performance and the constraints imposed by the long straight sections in steel pipes through the earth muon absorber.

In this note a possibility is pointed out for upgrading M6 to 280 GeV operation without losing the other properties of the beam design. 280 GeV is a compromise between technical complications (no superconducting elements, minimum amount of alterations) and the desire to reach the highest possible energies. Since it is unlikely that the incident proton beam energy will be higher than 300 GeV for some time, this compromise limit of 280 GeV in the M6 line seems reasonable.

Only the recombined mode of the east branch of M6 which feeds the Single Arm Spectrometer (SAS) is studied here. The dispersed mode differs slightly in the tune of quadrupoles (M6Q8, M6Q9, M6Q10A) and represents, therefore, no additional problems. Similarly the 280 GeV beam could be switched, as now, to the west branch by powering 2 bends (M6B10, M6B11) differently. Not included here is the upgrading for the SAS, and experiments in the west branch. These questions should be solved separately, depending on the experiments supposed to run in the future.

The details of the new design are documented in the appended layout sheet and transport run.

#### Main Features

The production angle and beam angle at all 3 foci are unchanged, as well as their z locations. Only the second focus moves 4 inches east, the others staying exactly where they are now. In the optics the point to parallel to point focusing is maintained, and magnifications, dispersion, momentum resolution, and the accepted phase space are virtually the same as before.

As a drawback one must consider the loss of the 48 ft long parallel region around 1250 ft suited for a differential Cerenkov counter. The horizontal and vertical collimators (aperture stops) in the first stage appear

to be no serious loss. The second stage now has a vertical stop and has space for a horizontal stop also, and in the first stage there would be space for 2 collimators if one is willing to custom-tailor them. The vernier M6V2 (horizontal) in the first stage disappeared, but this is not crucial since the bend magnets will have to be powered separately in the first stage eliminating the need for trimming with M6V2.

Additional Elements

- a. M6B9A and M6B9B, two 20' B2 magnets between B9 and B10 in the third stage.
- b. M6B6A, an 8' B2 magnet downstream of M6B6 (if separately powered, it could be also 10' long) in the second stage.
- c. M6B3A, a 20' B2 magnet added in the first stage.
- d. M6B2AS, a 10' septum magnet (exists).
- e. M6Q1A, M6Q13A, two additional 3Q60 quadrupoles in the first and third stages, respectively.

Necessary Movements of Existing Components

- a. Q1-Q4 and B3-B5 have to be repositioned.
- b. Q7, B6, Q8, Q9 move 6 to 12 ft further downstream (including verniers and sextupoles in this region).
- c. All elements between Q10A and B11 move up to 4 inches to the east.

Minor Problems

The presently existing 3" quadrupoles have a limit of 7.5 kG at 1.5" radius, set by total power dissipation (and field quality). Q1, Q2, Q3, and Q4 will all run somewhat harder, up to 8.17 kG at 280 GeV. This could not be avoided by repositioning the quads. Possible alternatives might be better cooling or an improved quad design with higher gradient. Running the first stage in a point-to-point mode to achieve lower quad excitations seems very unattractive since both the solid angle and the momentum acceptance would be seriously degraded.

A similar high field is required in M6Q11, but here one can increase the spacing between the quads, or replace M6Q11 with a 10 ft quad and avoid the trouble. The only other trouble spots are the field lenses M6Q5 and M6Q10, where a 3" aperture is limiting the momentum acceptance severely and a larger bore quad would be advantageous. However, the existing M6 line suffers the identical momentum acceptance limit. Both M6B3 and M6Q1 will be moved further upstream by a small amount and, therefore, closer to the neutral beam line. A small amount of machining off the corners of these magnets may be necessary.

Power Requirements

The new M6 line, including the present SAS, would consume

about 4.0 MW compared to 2.8 MW now at maximum energy. These figures do not include bus losses and additions for saturation and heating of the magnets. The second and third stage of M6 can be powered by the existing installed supplies in the West Alcove. Upgrading the SAS in addition is likely to exceed the total power limit of the substation for the West Alcove. Two additional groups of Transrex power supplies would be needed in Service Building MS21 to power three septum magnets and four 20' B2 magnets, adding substantially to the demand in this service building.

In summary, upgrading of the M6 line seems a feasible project without many severe problems, and a maximum energy of 280 GeV can be achieved without resorting to special new magnet designs or superconducting technology.

ME UPGRADED FOF 280 GEV/C  
+ THETA 0\* 16. 19. 0.1432391E-00

2.		0.09339 DEG			
0.202	0.0	80.750	FT	80.750	FT
0.0	0.0	1.724	CM	1.000	
0.0	0.0	0.700	MR	0.000	
0.0	0.0	1.601	CM	0.000	
0.0	0.0	0.650	MR	0.000	1.000
0.0	0.0	0.0	CM	0.0	0.0
0.0	0.0	1.000	PC	0.0	0.0
		0.0		0.18687 DEG )	
4.		"B1S "		10.25000 FT	
		9.75000 KG			
0.244	-0.000	91.000	FT	91.000	FT
0.0	0.0	1.942	CM	0.999	
0.0	0.0	0.701	MR	0.000	
0.0	0.0	1.804	CM	0.000	
0.0	0.0	0.650	MR	0.000	1.000
0.0	0.0	0.006	CM	-1.000	-0.999
0.0	0.0	1.000	PC	0.003	0.047
		0.0		0.0	
		0.0		0.0	
		0.0		-0.000	
		0.0		-0.000	
		0.0		-0.001	

2.		0.09339 DEG	
0.744	-0.000	91.000 FT	91.000 FT
0.0	0.0		
0.0	0.0	1.942 CM	0.999
0.0	0.0	0.701 MR	0.000
0.0	0.0	1.834 CM	0.000
0.0	0.0	0.650 MR	1.000
0.0	0.0	0.006 CM	-1.000
0.7	1.770 PC	0.003	-0.999
		0.047	-0.000
		0.0	-0.000
		0.0	-0.001

C. 744 -C. 000 91.000 FT 91.000 FT 0.0 1.942 CM  
C. 744 -C. 000 91.000 FT 91.000 FT 0.0 0.701 MR  
C. 744 -C. 000 91.000 FT 91.000 FT 0.0 1.804 CM  
C. 744 -C. 000 91.000 FT 91.000 FT 0.0 0.999

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100.000000 DEG

0.346	-0.000	104.749 FT	104.750 FT	0.0	2.236 CM	0.996	
				0.0	0.703 MR	0.000	
				0.0	2.076 CM	0.000	
				0.0	0.650 MR	0.000	1.000
				0.0	0.013 CM	-1.000	-0.000
				0.0	1.000 PC	0.011	0.0
* RRTAT*						0.093	-0.004
0.346	-0.000	104.749 FT	104.750 FT	0.0	2.236 CM	0.996	
				0.0	0.703 MR	0.000	
				0.0	2.076 CM	0.000	
				0.0	0.650 MR	0.000	
				0.0	0.013 CM	-1.000	-0.000
				0.0	1.000 PC	0.011	0.0
* REND*						0.093	-0.004
0.455	-0.000	114.999 FT	115.000 FT	0.0	2.455 CM	0.993	
				0.0	0.707 MR	0.000	
				0.0	2.279 CM	0.000	
				0.0	0.650 MR	0.000	1.000
				0.0	0.020 CM	-1.000	-0.000
				0.0	1.000 DC	0.021	0.0
* RCTAT*						0.138	-0.009
0.455	-0.000	114.999 FT	115.000 FT	0.0	2.455 CM	0.993	
				0.0	0.707 MR	0.000	
				0.0	2.279 CM	0.000	
				0.0	0.650 MR	0.000	
				0.0	0.020 CM	-1.000	-0.000
				0.0	1.000 PC	0.021	0.0
* RCTAT*						0.138	-0.009
0.455	-0.000	114.999 FT	115.000 FT	0.0	2.455 CM	0.993	
				0.0	0.707 MR	0.000	
				0.0	2.279 CM	0.000	
				0.0	0.650 MR	0.000	1.000
				0.0	0.020 CM	1.000	-0.000
				0.0	1.000 PC	-0.021	0.0
* RCTAT*						0.138	-0.009
0.612	-0.000	127.768 FT	127.770 FT	0.0	2.728 CM	0.994	
				0.0	0.707 MR	0.000	
				0.0	2.532 CM	-0.000	
				0.0	0.650 MR	-0.000	
				0.0	0.020 CM	1.000	
				0.0	1.000 PC	-0.021	
* CRAFT*						0.138	-0.009
0.735	-0.000	137.767 FT	137.770 FT	0.0	3.240 CM	1.000	
				0.0	2.714 MR	-0.000	
				0.0	2.463 CM	-0.000	
				0.0	1.002 MR	0.000	
				0.0	0.020 CM	0.999	
				0.0	1.000 PC	-0.040	
* DRIFT*						0.063	-0.009
1.753	-0.000	139.267 FT	139.270 FT	0.0	3.364 CM	0.000	

\* CRAFT\*

0.093339 DEG

\* RRTAT\*

0.092339 DEG

\* REND\*

0.092339 DEG

\* RCTAT\*

0.753	-0.000	139.267 FT	139.270 FT	0.0	3.364 CM	1.000
				0.0	2.714 MR	-0.000
				0.0	2.413 CM	-0.000
				0.0	1.092 MR	-0.000
				0.0	0.020 CM	0.999 -1.000
				0.0	1.330 PC	-0.041 -0.063 0.000 0.000
* QUAD*		"CIA"	5.00000 FT	-2.71622 KG	3.81000 CM	( -281.19971 FT )
0.815	-0.000	144.266 FT	144.270 FT	0.0	3.808 CM	1.000
				0.0	3.130 MR	-0.000
				0.0	2.226 CM	-0.000
				0.0	1.362 MR	-0.000 -1.000
				0.0	0.020 CM	0.999 -0.000
				0.0	1.000 PC	-0.043 -0.060 0.000 0.000
* DRIFT*						
0.858	-0.000	147.766 FT	147.770 FT	0.0	4.142 CM	1.000
				0.0	3.130 MR	-0.000
				0.0	2.081 CM	-0.000
				0.0	1.362 MR	-0.000 -1.000
				0.0	0.220 CM	0.999 -0.000
				0.0	1.000 PC	-0.045 -0.060 0.000 0.000
* QUAD*						
0.980	-0.000	157.765 FT	157.770 FT	0.0	4.628 CM	0.044
				0.0	0.045 MR	-0.000
				0.0	1.877 CM	-0.000
				0.0	0.017 MR	-0.000 -0.014
				0.0	0.020 CM	0.999 -0.000
				0.0	1.000 PC	-0.048 -0.986 0.000 0.000
* DRIFT*						
0.999	-0.000	159.265 FT	159.270 FT	0.0	4.628 CM	0.045
				0.0	0.045 MR	0.000
				0.0	1.876 CM	-0.000
				0.0	0.017 MR	-0.000 -0.013
				0.0	0.020 CM	0.999 -0.000
				0.0	1.000 PC	-0.048 -0.986 0.000 0.000
* TRANSFORM 1*						
1.44897	6.60327	-0.00000	-0.00000	0.0	-0.22314	
-0.15144	-0.00000	-0.00000	0.0		-0.04420	
-0.55000	-0.00000	0.49713	2.88667	0.0	0.00000	
-0.00000	-0.00000	-0.34642	-0.00000	0.0	0.00000	
0.00578	0.07919	-0.00000	1.00000	-0.00000	1.00000	
0.0	2.0	0.0	0.0	0.0	1.00000	
* 2 Rn*						
20.					180.00000 DEG	
0.999	-0.000	159.265 FT	159.270 FT	0.0	4.628 CM	0.045
				0.0	0.045 MR	0.000
				0.0	1.876 CM	-0.000
				0.0	0.017 MR	-0.000 -0.013
				0.0	0.020 CM	0.999 -0.000
				0.0	1.000 PC	-0.048 -0.986 0.000 0.000
* RnTAT*						
2.					0.35810 DEG	
0.999	-0.000	159.265 FT	159.270 FT	0.0	4.628 CM	0.058
				0.0	0.045 MR	0.000
				0.0	1.876 CM	-0.000
				0.0	0.017 MR	-0.000 -0.027

\*REFND\*

4. "B3" 20.00000 FT 19.14998 KG 0.0 0.00000 FT 19.14998 KG 0.0 0.00000 FT 19.14998 KG 0.0

1.360 -0.000 179.261 FT 179.270 FT 0.0 4.632 CM 0.058  
0.0 0.169 MR 0.000  
0.0 1.876 CM 0.000  
0.0 0.017 MR -0.000 -0.022  
0.0 0.078 CM -1.000 -0.038 -0.000 0.000  
0.0 1.000 PC 0.062 0.999 0.000 -0.000 -0.042

\*PCTAT\*

2. 0.35810 DEG 1.365 -0.000 179.261 FT 179.270 FT 0.0 4.632 CM 0.061  
0.0 0.169 MR 0.000  
0.0 1.876 CM 0.000  
0.0 0.017 MR -0.000 -0.035  
0.0 0.078 CM -1.000 -0.041 -0.000 0.000  
0.0 1.000 OC. 0.062 0.999 0.000 -0.000 -0.042

\*Z R0\*

20. -180.00000 DEG 1.369 -0.000 179.261 FT 179.270 FT 0.0 4.632 CM 0.061  
0.0 0.169 MR 0.000  
0.0 1.876 CM 0.000  
0.0 0.017 MR -0.000 -0.035  
0.0 0.078 CM 1.000 0.041 -0.000 0.000  
0.0 1.000 PC -0.062 -0.999 0.000 0.000 -0.042

\*DRAFT\*

3. 1.50000 FT 1.407 -0.000 180.761 FT 180.770 FT 0.0 4.632 CM 0.063  
0.0 0.169 MR 0.000  
0.0 1.876 CM 0.000  
0.0 0.017 MR -0.000 -0.035  
0.0 0.078 CM 1.000 0.041 -0.000 0.000  
0.0 1.000 PC -0.064 -0.999 0.000 0.000 -0.042

\*Z R0\*

20. 180.00000 DEG 1.407 -0.000 180.761 FT 180.770 FT 0.0 4.632 CM 0.063  
0.0 0.169 MR 0.000  
0.0 1.876 CM 0.000  
0.0 0.017 MR -0.000 -0.035  
0.0 0.078 CM -1.000 -0.041 -0.000 0.000  
0.0 1.000 PC 0.064 0.999 0.000 -0.000 -0.042

\*PCTAT\*

2. 0.35910 DEG 1.407 -0.000 180.761 FT 180.770 FT 0.0 4.632 CM 0.067  
0.0 0.169 MR 0.000  
0.0 1.876 CM 0.000  
0.0 0.017 MR -0.000 -0.049  
0.0 0.078 CM -1.000 -0.045 -0.000 0.000  
0.0 1.000 PC 0.064 0.999 0.000 -0.000 -0.042

\*REFND\*

4. "B3A" 20.00000 FT 19.14998 KG 0.0 0.00000 FT 19.14998 KG 0.0 0.00000 FT 19.14998 KG 0.0 0.00000 FT 19.14998 KG 0.0

2.027 -0.000 200.751 FT 200.770 FT 0.0 4.643 CM 0.092  
0.0 0.294 MR 0.000  
0.0 1.876 CM 0.000  
0.0 0.017 MR -0.000 -0.043  
0.0 0.136 CM -0.999 -0.055 -0.000 0.000  
0.0 1.000 PC 0.094 1.000 0.000 -0.000 -0.057

\*PCTAT\*

2. 0.35810 DEG



0.0	0.419 MR	0.143
0.0	1.875 CM	-0.000 -0.000
0.0	0.017 MR	-0.000 -0.000 -0.079
0.0	0.194 CM	0.998 0.075 -0.000 -0.000
0.0	1.000 PC	-0.143 -1.000 0.000 0.000 -0.076

## \*DRIFT\*      3.      1.50000 FT

3.028	-0.000	223.729 FT	223.770 FT	0.0	4.673 CM	
				0.0	0.419 MR	0.147
				0.0	1.875 CM	-0.000 -0.000
				0.0	0.017 MR	-0.000 -0.000 -0.078
				0.0	0.194 CM	0.997 0.075 -0.000 -0.000
				0.0	1.000 PC	-0.147 -1.000 0.000 0.000 -0.076

## \*Z RO\*      20.      180.00000 DEG

3.028	-0.000	223.729 FT	223.770 FT	0.0	4.673 CM	
				0.0	0.419 MR	0.147
				0.0	1.875 CM	0.000 -0.000
				0.0	0.017 MR	-0.000 -0.000 -0.078
				0.0	0.194 CM	-0.997 -0.075 -0.000 0.000
				0.0	1.000 PC	0.147 1.000 -0.000 -0.000 -0.076

## \*PCTAT\*      2.      0.35810 DEG

3.028	-0.000	223.729 FT	223.770 FT	0.0	4.673 CM	
				0.0	0.419 MR	0.148
				0.0	1.875 CM	0.000 -0.000
				0.0	0.017 MR	-0.000 -0.000 -0.092
				0.0	0.194 CM	-0.997 -0.077 -0.000 0.000
				0.0	1.000 PC	0.147 1.000 -0.000 -0.000 -0.076

## \*REND\*      4.      "B5"      20.00000 FT      19.14998 KG      0.0      0.71614 DEG )

4.148	-0.000	243.697 FT	243.770 FT	0.0	4.725 CM	
				0.0	0.544 MR	0.206
				0.0	1.874 CM	0.000 -0.000
				0.0	0.017 MR	-0.000 -0.000 -0.086
				0.0	0.253 CM	-0.994 -0.098 -0.000 0.000
				0.0	1.000 PC	0.208 1.000 -0.000 -0.000 -0.099

## \*POTAT\*      2.      0.35810 DEG

4.148	-0.000	243.697 FT	243.770 FT	0.0	4.725 CM	
				0.0	0.544 MR	0.207
				0.0	1.874 CM	0.000 -0.000
				0.0	0.017 MR	-0.000 -0.000 -0.100
				0.0	0.253 CM	-0.994 -0.099 -0.000 0.000
				0.0	1.000 PC	0.208 1.000 -0.000 -0.000 -0.099

## \*Z RO\*      20.      -180.00000 DEG

4.148	-0.000	243.697 FT	243.770 FT	0.0	4.725 CM	
				0.0	0.544 MR	0.207
				0.0	1.874 CM	-0.000 -0.000
				0.0	0.017 MR	-0.000 -0.000 -0.100
				0.0	0.253 CM	0.994 0.099 -0.000 -0.000
				0.0	1.000 PC	-0.208 -1.000 0.000 0.000 -0.099

## \*DRTET\*      3.      1.50000 FT

4.241	-0.000	245.194 FT	245.269 FT	0.0	4.731 CM	
				0.0	0.544 MR	0.212
				0.0	1.874 CM	-0.000 -0.000
				0.0	0.017 MR	-0.000 -0.000 -0.099

\*CLAN\*

5.	"C3"	"	10.00000 FT	7.73573 KG	0.0	3.81000 CM	( 51.22119 FT )	
4. E64	-0.000	255.175 FT	255.269 FT	0.0	4.298 CM	-0.980	-0.213 -1.000	0.000 0.000 -0.099
				0.0	2.965 MR	-0.000	-0.000	-0.000
				0.0	2.066 CM	-0.000	-0.000	-0.000
				0.0	1.282 MR	-0.000	-0.000	-0.000
				0.0	0.253 CM	0.989	-0.999	-0.000 -0.000
				0.0	1.000 PC	-0.248	0.052	0.000 0.000 -0.099

\*TOTAL\*

3.			1.50000 FT					
4. E957	-0.000	256.672 FT	256.769 FT	0.0	4.165 CM	-0.979	-0.000	-0.000
				0.0	2.965 MR	-0.000	-0.000	-0.000
				0.0	2.124 CM	-0.000	-0.000	-0.000
				0.0	1.282 MR	-0.000	-0.000	-0.000
				0.0	0.253 CM	0.988	-0.999	-0.000 -0.000
				0.0	1.000 PC	-0.254	0.052	0.000 0.000 -0.099

\*QUAN\*

5.	"C4"	"	10.00000 FT	-8.03880 KG	0.0	3.81000 CM	-46.02092 FT )	
5. E579	-0.000	266.652 FT	266.769 FT	0.0	3.699 CM	-0.293	-0.000	-0.000
				0.0	0.711 MR	-0.000	-0.000	-0.000
				0.0	2.293 CM	-0.000	-0.000	-0.000
				0.0	0.263 MR	-0.000	-0.000	-0.000
				0.0	0.253 CM	0.978	-0.486	-0.000 0.000
				0.0	1.000 PC	-0.304	-0.822	0.000 0.000 -0.099

\*CFLIFT\*

3.			285.23975 FT					
23. E333	-0.000	551.339 FT	552.009 FT	0.0	6.207 CM	0.822	-0.000	-0.000
				0.0	0.711 MR	-0.000	-0.000	-0.000
				0.0	0.124 CM	-0.000	-0.000	-0.000
				0.0	0.263 MR	-0.000	-0.000	-0.000
				0.0	0.253 CM	0.009	-0.486	-0.000 0.000
				0.0	1.000 PC	-1.000	-0.822	0.000 0.000 -0.099

\*TRANSFOPM 1\*

-1.72706	0.00008	-0.00000	-0.00000	0.0	-6.20596			
-0.27947	-0.57900	-0.00000	-0.00000	0.0	-0.58457			
-0.00000	-0.00000	-2.47610	0.00006	0.0	0.00000			
-0.00000	-0.00000	-0.20116	-0.40385	C.0	0.00000			
0.07748	0.35933	-0.00000	-0.00000	1.00000	-0.02506			
0.0	0.0	0.0	0.0	0.0	1.00000			

\*QUAN\*

5.	"C5FL"	"	5.00000 FT	5.22757 KG	0.0	3.81000 CM	147.37895 FT )	
23. E44	-0.000	556.329 FT	557.009 FT	0.0	6.190 CM	-0.892	-0.000	-0.000
				0.0	0.900 MR	-0.000	-0.000	-0.000
				0.0	0.134 CM	-0.000	-0.000	-0.000
				0.0	0.270 MR	-0.000	-0.000	-0.000
				0.0	0.253 CM	0.089	-0.529	-0.000 0.432
				0.0	1.000 PC	-1.000	0.897	0.000 0.000 -0.099

\*TOTAL\*

3.			207.26999 FT					
36. E44	-0.000	763.197 FT	764.279 FT	0.0	2.800 CM	0.058	-0.000	-0.000
				0.0	0.900 MR	-0.000	-0.000	-0.000
				0.0	1.766 CM	-0.000	-0.000	-0.000
				0.0	0.270 MR	-0.000	-0.000	-0.000
				0.0	0.253 CM	-0.878	-0.529	-0.000 0.998
				0.0	1.000 PC	-0.390	0.897	0.000 0.000 -0.099

\*CLAN\*

5.	"C6"	"	10.00000 FT	-6.63053 KG	0.0	3.81000 CM	( -56.13400 FT )
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\*DRAFT\*

27.167	-0.000	773.178 FT	774.279 FT
0.0	3.076 CM		
0.0	1.955 MR		
0.0	1.695 CM		
0.0	0.728 MR		
0.0	0.253 CM		
0.0	1.000 PC		
	-0.000 0.000		
	-0.000 -1.000		
	-0.918 -1.000 0.000 0.000		
	-0.304 0.123 0.303 -0.000 -0.099		

10.30000 FT

37.808	-0.000	783.458 FT	784.579 FT
0.0	3.642 CM		
0.0	1.955 MR		
0.0	1.466 CM		
0.0	0.728 MR		
0.0	0.253 CM		
0.0	1.000 PC		
	-0.000 0.000		
	-0.000 -1.000		
	-0.944 -1.000 -0.000 0.000		
	-0.236 0.123 0.000 -0.000 -0.099		

\*OLANT\*

5.	"C7 "	10.00000 FT	6.06000 KG
38.430	-0.000	793.438 FT	794.579 FT
0.0	3.81000 CM		
0.0	3.906 CM		
0.0	0.655 MR		
0.0	1.356 CM		
0.0	0.024 MP		
0.0	0.253 CM		
0.0	1.000 PC		
	-0.000 0.000		
	-0.000 -0.196		
	-0.960 -0.099 -0.000 0.000		
	-0.184 1.000 0.000 -0.000 -0.099		

\*TRANSFORM 1\*

0.18235	-0.00000	-5.48372	0.00000	-0.00000	0.0	-0.72050
-0.00000	-0.00000	0.00000	0.30000	0.0	0.65526	
0.00000	0.00000	-5.32506	-2.04557	0.0	0.00001	
0.07248	0.35933	0.48837	0.00000	0.0	-0.00000	
0.0	0.0	-0.00000	-0.00000	1.00000	-0.02506	
0.0	0.0	0.0	0.0	0.0	1.00000	

\*CRIFT\*

3.		1.50000 FT	
38.574	-0.000	794.935 FT	796.079 FT
0.0	3.901 CM		
0.0	0.655 MR		
0.0	1.356 CM		
0.0	0.024 MR		
0.0	0.253 CM		
0.0	1.000 PC		
	-0.000 0.000		
	-0.000 -0.177		
	-0.962 -0.099 -0.000 0.000		
	-0.177 1.000 0.000 -0.000 -0.099		

\*SEXT\*

18.	"X5 "	2.50000 FT	0.0	KG	5.00000 CM
38.670	-0.000	797.430 FT	798.578 FT		
0.0	3.892 CM				
0.0	0.655 MR				
0.0	1.355 CM				
0.0	0.024 MR				
0.0	0.253 CM				
0.0	1.000 PC				
	-0.000 0.000				
	-0.000 -0.165				
	-0.965 -0.099 -0.000 0.000				
	-0.165 1.000 0.000 -0.000 -0.099				

\*SELT\*

3.		6.50000 FT	
39.084	-0.000	803.918 FT	805.078 FT
0.0	3.873 CM		
0.0	0.655 MR		
0.0	1.354 CM		
0.0	0.024 MP		
0.0	0.253 CM		
0.0	1.000 PC		
	-0.000 0.000		
	-0.000 -0.191		
	-0.973 -0.099 -0.000 0.000		
	-0.132 1.000 0.000 -0.000 -0.099		

\*Z RLT\*

20.		180.00000 DEG	
39.084	-0.000	803.918 FT	805.078 FT
0.0	3.873 CM		
0.0	0.655 MP		
0.0	1.354 CM		

*POINT*		0.34922 DEG			
39. CP4	-0.000	803.918 FT	805.078 FT	0.0	3.873 CM
				0.0	0.655 MR
				0.0	1.354 CM
				0.0	0.924 MR
				0.0	0.253 CM
				0.0	0.132 PC
				0.0	0.000 -0.099
				0.0	0.000 -1.000
				0.0	0.000 0.000
				0.0	0.000 -0.099
*POINT*		4. " 20.00000 FT		18.68999 KG	
				0.0	0.69894 DEG 1
40.450	-0.000	823.871 FT	825.078 FT	0.0	3.842 CM
				0.0	0.533 MR
				0.0	1.352 CM
				0.0	0.024 MR
				0.0	0.207 CM
				0.0	1.000 PC
				0.0	0.039 -1.000
				0.0	0.000 -0.000
				0.0	0.000 -0.140
*POINT*		2. 0.34922 DEG			
40.450	-0.000	823.871 FT	825.078 FT	0.0	3.842 CM
				0.0	0.533 MR
				0.0	1.352 CM
				0.0	0.025 MR
				0.0	0.207 CM
				0.0	1.000 PC
				0.0	0.039 -1.000
				0.0	0.000 -0.000
				0.0	0.000 -0.140
*POINT*		-180.00000 DEG			
40.450	-0.000	823.871 FT	825.078 FT	0.0	3.842 CM
				0.0	0.533 MR
				0.0	1.352 CM
				0.0	0.025 MR
				0.0	0.207 CM
				0.0	1.000 PC
				0.0	0.039 1.000
				0.0	0.000 0.000
				0.0	0.000 -0.140
*POINT*		1. 1.50000 FT			
40.562	-0.000	825.366 FT	826.578 FT	0.0	3.841 CM
				0.0	0.533 MR
				0.0	1.351 CM
				0.0	0.025 MR
				0.0	0.207 CM
				0.0	1.000 PC
				0.0	0.032 1.000
				0.0	0.000 0.000
				0.0	0.000 -0.140
*POINT*		20. 180.00000 DEG			
40.562	-0.000	825.366 FT	826.578 FT	0.0	3.841 CM
				0.0	0.533 MR
				0.0	1.351 CM
				0.0	0.025 MR
				0.0	0.207 CM
				0.0	1.000 PC
				0.0	0.032 1.000
				0.0	0.000 0.000
				0.0	0.000 -0.140
*POINT*		? 0.13980 DEG			
40.562	-0.000	825.366 FT	826.578 FT	0.0	3.841 CM
				0.0	0.533 MR
				0.0	1.351 CM
				0.0	0.025 MR
				0.0	0.207 CM
				0.0	1.000 PC
				0.0	0.032 1.000
				0.0	0.000 0.000
				0.0	0.000 -0.140

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1938-1940

18.00000 F | 8.00000 " 188A "

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1.177	-0.370	833.343 FT	834.578 FT
0.0	3.839 CM	-0.001	
0.0	0.485 MP	0.000	
0.0	1.350 CM	0.000	
0.0	0.025 MR	-0.000	-0.191
0.0	0.189 CM	0.155	0.000
0.0	1.222 PC	0.000	-0.000

1.177	-0.000	833.343 FT	834.578 FT	0.0	3.839 CM	-0.000
				0.0	0.485 MR	0.000
				0.0	1.350 CM	0.000
				0.0	0.025 MR	-0.000 -0.193
				0.0	0.188 CM	0.988 0.155
				0.0	1.000 BC	0.000 -1.000

-180.00000 DEG		
-1.177	-0.000	833.343 FT
		834.578 FT
0.0	3.839 CM	-0.000
0.0	0.485 MR	0.000
0.0	1.350 CM	0.000
0.0	0.025 MR	-C.000 -C.000 -0.193
0.0	0.188 CM	-0.988 -0.155 -0.003 0.000
0.0	1.000 PC	-C.000 1.000 0.000 -0.000 -0.156

26	-5.48372	0.00070	0.00000	0.0	-0.00038
35	-0.00000	0.00000	0.00000	0.0	0.48448
CC	-C.00000	-4.72823	-2.04524	0.0	0.00001
200	0.00000	0.49056	0.00770	0.0	-0.00000
253	0.26568	0.00000	-0.00000	1.00000	-0.02931
0.0	0.0	0.0	0.0	0.0	1.00000

1.296	-0.000	834.838 FT	836.078 FT	1.50000 FT
			3.839 CM	0.005
	0.0	0.485 MR	0.000	0.000
	0.0	1.350 CM	0.000	0.000
	0.0	0.025 MR	-0.000	-0.000
	0.0	0.188 CM	-0.989	-0.155
	0.0	1.000 SC	0.000	0.000

	"X6	"	2.50000 FT	0.0	KG	5.00000 CM
+1.494	-0.000	837.330 FT	838.578 FT	0.0	3.839 CM	0.015
				0.0	0.485 MR	0.000
				0.0	1.350 CM	0.000
				0.0	0.025 MR	-0.000
				0.0	0.188 CM	-0.155
				0.0	1.000 PC	0.000
				0.0	0.015	0.000

	1.50000 FT	838.825 FT	840.078 FT	0.0	3.840 CM	0.021
	-0.000	-0.000	-0.000	0.0	0.485 MR	C.000
				0.0	1.349 CM	C.000
				0.0	0.025 MR	-0.000
				0.0	0.188 CM	-0.91 -0.155
				0.0	1.000 RC	0.021 1.900

47.405	-0.000	848.794 FT	850.078 FT	6.23418 KG	10.00000 FT	"08 "	"08	63.13922. FT
								3.81000 CM 2.235. M.R. -2.566.

*QUAD*	43.249	-0.000	860.656 FT	11.90000 FT	861.978 FT	0.0	2.831 CM	0.000	0.000
						0.0	2.035 MR	-0.946	
						0.0	1.726 CM	0.003	0.000
						0.0	0.736 MR	0.000	1.000
						0.0	0.188 CM	-0.996	-0.000
						0.0	1.000 PC	0.062	0.000
						0.0	0.198	0.000	-0.156
*DRIFT*	44.142	-0.000	870.625 FT	10.00000 FT	871.978 FT	0.0	2.483 CM	-0.454	
						0.0	0.841 MR	0.572	
						0.0	1.797 CM	0.000	0.000
						0.0	0.279 MR	-0.000	-0.998
						0.0	0.183 CM	-0.998	0.000
						0.0	1.000 PC	0.211	0.000
						0.0	0.775	-0.000	-0.156
*DRIFT*	52.409	-0.000	974.586 FT	104.28999 FT	976.268 FT	0.0	2.698 CM	-56.20372 FT	)
						0.0	0.841 MR		
						0.0	0.614 CM	0.000	
						0.0	0.279 MR	-0.000	-0.992
						0.0	0.188 CM	-0.420	0.000
						0.0	1.000 PC	0.962	0.000
						0.0	0.775	-0.000	-0.156
*QUAD*	53.222	-0.000	984.555 FT	10.00000 FT	986.268 FT	0.0	2.961 CM	-126.47684 FT	)
						0.0	1.393 MR	0.893	
						0.0	0.795 CM	0.000	
						0.0	0.495 MR	-0.000	-0.997
						0.0	0.188 CM	-0.354	0.000
						0.0	1.000 PC	0.979	0.000
						0.0	0.966	-0.000	-0.156
*DRIFT*	56.459	-0.000	1025.505 FT	41.07999 FT	1027.348 FT	0.0	4.592 CM	0.957	
						0.0	1.398 MR	-0.000	
						0.0	0.181 CM	-0.000	0.000
						0.0	0.498 MR	-0.000	-0.933
						0.0	0.188 CM	-0.188	0.000
						0.0	1.000 PC	0.999	0.000
						0.0	0.966	-0.000	-0.156
*QUAD*	57.251	-0.000	1035.474 FT	5.97291 KG	1037.348 FT	0.0	4.637 CM	-0.933	
						0.0	1.118 MR		
						0.0	0.075 CM	-0.000	0.000
						0.0	0.451 MR	-0.000	-0.282
						0.0	0.188 CM	-0.163	0.000
						0.0	1.000 PC	1.000	0.000
						0.0	0.966	-0.000	-0.156
*DRIFT*	57.476	-0.000	1038.295 FT	2.83000 FT	1040.178 FT	0.0	4.547 CM	-0.931	
						0.0	1.118 MR		
						0.0	0.074 CM	-0.000	0.000
						0.0	0.450 MR	-0.000	0.237

\*TRANSFORM 1\*

1.71135	0.00023	0.00000	0.00000	0.0	4.54655	0.0	0.450 MR	-0.000	0.000	0.237	
-0.27615	0.58428	-0.00000	-0.00000	0.0	-1.04059	0.0	0.188 CM	-0.155	0.506	0.000	0.000
0.00000	0.00000	1.48697	-0.00031	0.0	-0.00000	0.0	1.000 PC	1.000	-0.931	-0.000	-0.000
0.01000	0.00000	2.15651	0.67205	0.0	-0.00000	0.0					-0.156
0.05253	0.26568	0.00000	-0.00000	1.00000	-0.02931	0.0					
0.0	0.0	0.0	0.0	0.0	1.00000	0.0					

\*DRIFT\*

3. 82.89999 FT

64.048	-0.000	1120.934 FT	1123.078 FT	0.0	2.179 CM	0.0					
				0.0	1.118 MR	0.0	-0.646				
				0.0	1.157 CM	0.0	-0.000	0.000			
				0.0	0.450 MR	0.0	-0.000	0.000	0.998		
				0.0	0.188 CM	0.0	0.332	0.506	0.000	0.000	
				0.0	1.000 PC	0.0	0.880	-0.931	-0.000	-0.000	-0.156

\*QUAD\*

5. "Q12" 10.00000 FT -7.50000 KG

3.81000 CM (-49.44127 FT )

64.840	-0.000	1130.902 FT	1133.078 FT	0.0	2.185 CM	0.0					
				0.0	1.143 MR	0.0	0.667				
				0.0	1.178 CM	0.0	-0.000	-0.000			
				0.0	0.314 MR	0.0	0.000	0.000	-0.996		
				0.0	0.188 CM	0.0	0.445	0.964	0.000	-0.000	
				0.0	1.000 PC	0.0	0.815	0.112	-0.000	0.000	-0.156

\*DRIFT\*

3. 2.00000 FT

64.999	-0.000	1132.896 FT	1135.077 FT	0.0	2.232 CM	0.0					
				0.0	1.143 MR	0.0	0.684				
				0.0	1.159 CM	0.0	-0.000	-0.000			
				0.0	0.314 MR	0.0	0.000	0.000	-0.996		
				0.0	0.188 CM	0.0	0.466	0.964	0.000	-0.000	
				0.0	1.000 PC	0.0	0.801	0.112	-0.000	0.000	-0.156

\*QUAD\*

5. "Q11" 5.00000 FT -8.31518 KG

3.81000 CM (-91.29976 FT )

65.395	-0.000	1137.880 FT	1140.077 FT	0.0	2.416 CM	0.0					
				0.0	1.819 MR	0.0	0.906				
				0.0	1.080 CM	0.0	-0.000	-0.000			
				0.0	0.714 MR	0.0	0.000	0.000	-0.999		
				0.0	0.188 CM	0.0	0.512	0.828	0.000	-0.000	
				0.0	1.000 PC	0.0	0.768	0.425	-0.000	0.000	-0.156

\*DRIFT\*

3. 2.29000 FT

65.577	-0.000	1140.163 FT	1142.367 FT	0.0	2.532 CM	0.0					
				0.0	1.819 MR	0.0	0.915				
				0.0	1.030 CM	0.0	-0.000	-0.000			
				0.0	0.714 MR	0.0	0.000	0.000	-0.999		
				0.0	0.188 CM	0.0	0.531	0.828	0.000	-0.000	
				0.0	1.000 PC	0.0	0.755	0.425	-0.000	0.000	-0.156

\*QUAD\*

5. "Q13A" 5.00000 FT 3.79776 KG

3.81000 CM (202.54938 FT )

65.973	-0.000	1145.147 FT	1147.367 FT	0.0	2.756 CM	0.0					
				0.0	1.431 MR	0.0	0.882				
				0.0	0.934 CM	0.0	-0.000	-0.000			
				0.0	0.555 MR	0.0	0.000	0.000	-0.998		
				0.0	0.188 CM	0.0	0.564	0.887	0.000	-0.000	
				0.0	1.000 PC	0.0	0.727	0.318	-0.000	0.000	-0.156

66.132 -0.000 1147.141 FT 1149.367 FT 0.0 2.833 CM  
 0.0 1.431 MR 0.889  
 0.0 0.900 CM -0.000 -0.000  
 0.0 0.555 MR 0.000 0.000 -0.998  
 0.0 0.188 CM 0.576 0.887 0.000 -0.000  
 0.0 1.000 PC 0.717 0.318 -0.000 0.000 -0.156

\* QUAD\* 5. "C13" 10.00000 FT 7.50000 KG 3.81000 CM ( 52.77618 FT )

66.924 -0.000 1157.109 FT 1159.367 FT 0.0 2.941 CM  
 0.0 0.852 MR -0.670  
 0.0 0.816 CM -0.000 0.000  
 0.0 0.741 MR 0.000 -0.000 -0.262  
 0.0 0.188 CM 0.629 0.155 0.000 -0.000  
 0.0 1.000 PC 0.670 -1.000 -0.000 0.000 -0.156

\* PRIFT\* 3. 1.50000 FT

67.043 -0.000 1158.604 FT 1160.867 FT 0.0 2.915 CM  
 0.0 0.852 MR -0.663  
 0.0 0.815 CM -0.000 0.000  
 0.0 0.041 MR 0.000 -0.000 -0.260  
 0.0 0.188 CM 0.637 0.155 0.000 -0.000  
 0.0 1.000 PC 0.663 -1.000 -0.000 0.000 -0.156

\* TRANSFORM 1 \*

1.34358	3.11797	0.00000	0.00000	0.0	1.93176
-0.32073	-0.00004	-0.00000	-0.00000	0.0	-0.85209
0.00000	0.00000	4.29079	1.20981	0.0	-0.00000
-0.00000	-0.00000	-0.82599	0.00019	0.0	0.00000
0.05253	0.26568	0.00000	-0.00000	1.00000	-0.02931
0.0	0.0	0.0	0.0	0.0	1.00000

\* PCTAT\* 2. 0.34922 DEG

67.043 -0.000 1158.604 FT 1160.867 FT 0.0 2.915 CM  
 0.0 0.852 MR -0.663  
 0.0 0.815 CM -0.000 0.000  
 0.0 0.041 MR 0.000 -0.000 -0.263  
 0.0 0.188 CM 0.637 0.156 0.000 -0.000  
 0.0 1.000 PC 0.663 -1.000 -0.000 0.000 -0.156

\* END\*

4. "B7" 20.00000 FT 18.67998 KG 0.0 ( 0.69856 DEG )

68.507 -0.000 1178.551 FT 1180.867 FT 0.0 2.621 CM  
 0.0 0.731 MR -0.554  
 0.0 0.809 CM -0.000 0.000  
 0.0 0.041 MR 0.000 -0.000 -0.233  
 0.0 0.167 CM 0.630 0.298 0.000 -0.000  
 0.0 1.000 PC 0.553 -1.000 -0.000 0.000 -0.299

\* PCTAT\* 2. 0.34922 DEG

68.507 -0.000 1178.551 FT 1180.867 FT 0.0 2.621 CM  
 0.0 0.730 MR -0.553  
 0.0 0.809 CM -0.000 0.000  
 0.0 0.041 MR 0.000 -0.000 -0.236  
 0.0 0.167 CM 0.630 0.298 0.000 -0.000  
 0.0 1.000 PC 0.553 -1.000 -0.000 0.000 -0.299

\* PRIFT\* 3. 1.50000 FT

68.408 -0.000 1180.047 FT 1182.367 FT 0.0 2.602 CM  
 0.0 0.730 MR -0.545  
 0.0 0.809 CM -0.000 0.000

\*PCTAT\*

2.

68.608 -0.000 1180.047 FT 1182.367 FT  
 0.0 2.602 CM  
 0.0 -0.730 MR  
 0.0 0.808 CM  
 0.0 -0.000 0.000  
 0.0 0.041 MR  
 0.0 0.167 CM  
 0.0 0.638 0.298 0.000 -0.000  
 0.0 0.544 -1.000 PC  
 1.000 PC 0.544 -1.000 -0.000 0.000 -0.299

\*PEN\*

69.829 -0.000 1200.219 FT 1202.367 FT  
 0.0 2.405 CM  
 0.0 -0.609 MR  
 0.0 0.803 CM  
 0.0 -0.000 0.000  
 0.0 0.041 MR  
 0.0 0.148 CM  
 0.0 0.633 0.437 0.000 -0.000  
 0.0 0.419 -1.000 PC  
 1.000 PC 0.419 -1.000 -0.000 0.000 -0.437

\*PCTAT\*

69.829 -0.000 1200.010 FT 1202.367 FT  
 0.0 2.405 CM  
 0.0 -0.608 MR  
 0.0 0.803 CM  
 0.0 -0.000 0.000  
 0.0 0.041 MR  
 0.0 0.148 CM  
 0.0 0.633 0.437 0.000 -0.000  
 0.0 0.419 -1.000 PC  
 1.000 PC 0.419 -1.000 -0.000 0.000 -0.437

\*PCTAT\*

69.911 -0.000 1201.507 FT 1203.867 FT  
 0.0 2.393 CM  
 0.0 0.608 MR  
 0.0 0.802 CM  
 0.0 -0.000 0.000  
 0.0 0.041 MR  
 0.0 0.148 CM  
 0.0 0.641 0.437 0.000 -0.000  
 0.0 0.410 -1.000 PC  
 1.000 PC 0.410 -1.000 -0.000 0.000 -0.437

\*PCTAT\*

69.911 -0.000 1201.507 FT 1203.867 FT  
 0.0 2.393 CM  
 0.0 0.608 MR  
 0.0 0.802 CM  
 0.0 -0.000 0.000  
 0.0 0.041 MR  
 0.0 0.148 CM  
 0.0 0.641 0.437 0.000 -0.000  
 0.0 0.410 -1.000 PC  
 1.000 PC 0.410 -1.000 -0.000 0.000 -0.437

\*PEN\*

70.893 -0.000 1221.483 FT 1223.867 FT  
 0.0 2.277 CM  
 0.0 0.487 MR  
 0.0 0.798 CM  
 0.0 -0.000 0.000  
 0.0 0.041 MR  
 0.0 0.130 CM  
 0.0 0.622 0.573 0.000 -0.000  
 0.0 0.284 -0.999 -0.000 0.000 -0.574

\*PCTAT\*

70.893 -0.000 1221.483 FT 1223.867 FT  
 0.0 2.277 CM  
 0.0 0.487 MR  
 0.0 0.798 CM  
 0.0 0.041 MR  
 0.0 0.130 CM  
 0.0 0.622 0.573 0.000 -0.000  
 0.0 0.284 -0.999 -0.000 0.000 -0.574

1223.867 FT  
 0.0 0.69856 DEG )

0.34922 DEG

1223.867 FT  
 0.0 0.69856 DEG )

1223.867 FT  
 0.0 0.69856 DEG )

\*DRIFT\*

3. 1.50000 FT

2. 1.50000 FT

70.953 -0.000 1222.982 FT 1225.367 FT  
 0.0 2.270 CM  
 0.0 0.487 MR  
 0.0 0.797 CM  
 0.0 0.041 MR  
 0.0 0.130 CM  
 0.0 1.000 PC  
 0.0 0.275 -0.999 -0.000 0.000 -0.574

\*ROTAT\*

2. 0.34922 DEG

70.953 -0.000 1222.982 FT 1225.367 FT  
 0.0 2.270 CM  
 0.0 0.487 MR  
 0.0 0.797 CM  
 0.0 0.041 MR  
 0.0 0.130 CM  
 0.0 1.000 PC  
 0.0 0.275 -0.999 -0.000 0.000 -0.574

\*PEND\*

4. "B9A" 20.00000 FT 18.67998 KG

71.696 -0.000 1242.968 FT 1245.367 FT  
 0.0 2.213 CM  
 0.0 0.365 MR  
 0.0 0.793 CM  
 0.0 0.041 MR  
 0.0 0.113 CM  
 0.0 1.000 PC  
 0.0 0.165 -0.999 -0.000 0.000 -0.711

\*RATT\*

2. 0.34922 DEG

71.696 -0.000 1242.968 FT 1245.367 FT  
 0.0 2.213 CM  
 0.0 0.365 MR  
 0.0 0.793 CM  
 0.0 0.041 MR  
 0.0 0.113 CM  
 0.0 1.000 PC  
 0.0 0.165 -0.999 -0.000 0.000 -0.711

\*DRIFT\*

3. 1.50000 FT

71.732 -0.000 1244.467 FT 1246.867 FT  
 0.0 2.210 CM  
 0.0 0.365 MR  
 0.0 0.793 CM  
 0.0 0.041 MR  
 0.0 0.113 CM  
 0.0 1.000 PC  
 0.0 0.158 -0.999 -0.000 0.000 -0.711

\*PEND\*

2. 0.34922 DEG

71.732 -0.000 1244.467 FT 1246.867 FT  
 0.0 2.210 CM  
 0.0 0.365 MR  
 0.0 0.793 CM  
 0.0 0.041 MR  
 0.0 0.113 CM  
 0.0 1.000 PC  
 0.0 0.157 -0.999 -0.000 0.000 -0.711

\*PEND\*

4. "B9B" 20.00000 FT 18.67998 KG

72.222 -0.000 1264.461 FT 1266.867 FT  
 0.0 2.189 CM  
 0.0 0.243 MR  
 0.0 0.789 CM  
 0.0 0.041 MR  
 0.0 0.099 CM  
 0.0 1.000 PC  
 0.0 0.076 -0.998 -0.000 0.000 -0.844

\*ROTAT\*

0.34922 DEG

72.222	-0.000	1264.461 FT	1266.867 FT	0.0 0.0 0.0 0.0 0.0 0.0	2.189 CM 0.243 MR 0.789 CM 0.041 MR 0.099 CM 1.000 PC	-0.075 -0.000 0.000 0.000 -0.000 -0.122 0.471 0.842 0.000 -0.000 0.075 -0.098 -0.000 0.000 -0.844
*DRIFT*	3.	1.50000 FT				
72.250	-0.000	1265.961 FT	1268.367 FT	0.0 0.0 0.0 0.0 0.0 0.0	2.188 CM 0.243 MR 0.789 CM 0.041 MR 0.099 CM 1.000 PC	-0.070 -0.000 0.000 0.000 -0.000 -0.120 0.476 0.842 0.000 -0.000 0.070 -0.098 -0.000 0.000 -0.844
*EFTAT*	2.	0.34922 DEG				
72.250	-0.000	1265.961 FT	1268.367 FT	0.0 0.0 0.0 0.0 0.0 0.0	2.188 CM 0.243 MR 0.789 CM 0.041 MR 0.099 CM 1.000 PC	-0.069 -0.000 0.000 0.000 -0.000 -0.122 0.476 0.843 0.000 -0.000 0.070 -0.098 -0.000 0.000 -0.844
*BEND*	4.	"B10 "	20.00000 FT	18.67998 KG	0.0	( 0.69856 DEG )
72.496	-0.000	1285.959 FT	1288.367 FT	0.0 0.0 0.0 0.0 0.0 0.0	2.183 CM 0.122 MR 0.786 CM 0.041 MR 0.089 CM 1.000 PC	-0.022 -0.000 0.000 0.000 -0.000 -0.090 0.279 0.946 0.000 -0.000 0.019 -0.991 -0.000 0.000 -0.955
*RCTAT*	2.	0.34922 DEG				
72.496	-0.000	1285.959 FT	1288.367 FT	0.0 0.0 0.0 0.0 0.0 0.0	2.183 CM 0.122 MR 0.786 CM 0.042 MR 0.089 CM 1.000 PC	-0.020 -0.000 0.000 0.000 -0.000 -0.093 0.279 0.946 0.000 -0.000 0.019 -0.991 -0.000 0.000 -0.955
*CPIFT*	3.	1.50000 FT				
72.505	-0.000	1287.459 FT	1289.867 FT	0.0 0.0 0.0 0.0 0.0 0.0	2.183 CM 0.122 MR 0.786 CM 0.042 MR 0.089 CM 1.000 PC	-0.017 -0.000 0.000 0.000 -0.000 -0.090 0.281 0.946 0.000 -0.000 0.017 -0.991 -0.000 0.000 -0.955
*ROTAT*	2.	0.34922 DEG				
72.505	-0.000	1287.459 FT	1289.867 FT	0.0 0.0 0.0 0.0 0.0 0.0	2.183 CM 0.122 MR 0.786 CM 0.042 MR 0.089 CM 1.000 PC	-0.015 -0.000 0.000 0.000 -0.000 -0.093 0.281 0.947 0.000 -0.000 0.017 -0.991 -0.000 0.000 -0.955
*BEND*	4.	"B11 "	20.00000 FT	18.67998 KG	0.0	( 0.69856 DEG )
72.507	-0.000	1307.459 FT	1309.867 FT	0.0 0.0 0.0	2.182 CM 0.016 MR 0.784 CM	-0.016 -0.000 -0.000



0.0	1.036	CN	-0.000	0.000
0.0	0.731	MR	-0.000	0.999
0.0	0.085	C M	-0.005	0.004
0.0	1.000	PC	0.001	-0.000
0.0			0.000	-1.000

"016" 10.00000 FT -6.34965 KG

1389.687 FT

0.0	0.738	UN	-0.737	
0.0	1.173	CN	-0.000	0.000
0.0	0.125	MR	-0.000	0.975
0.0	0.085	CN	-C.006	-0.000
0.0	1.000	PC	0.002	-1.000

"017" 10.00000 FT -6.34965 KG

1600 826 EI

0.0	0.416 MR	-0.996
0.0	1.113 CM	-0.000
0.0	0.509 MR	-0.999
0.0	0.085 CM	-0.007
0.0	1.000 PC	-0.003

CONTENTS

71.52998 FT -0.000 1470.055 FT 1472.466 FT

0.0	0.416	MR	0.057
0.0	0.064	CM	0.000
0.0	0.509	MP	0.000
0.0	0.785	CM	-0.035
0.0	1.000	PC	-0.000

TRANSACTIONS 1\*

1-68341	-0.00023	-0.00000	-0.00000	0.0	0.00725
0-45855	-0.59406	-0.00000	-0.00000	0.0	0.00206
0.00000	-0.00000	-1.27948	0.00028	0.0	0.00000
0-00000	0.00000	0.32397	-0.78224	0.0	0.00000
0.00002	-0.00042	0.00000	-0.00000	1.00000	-0.08467
0.00000	0.00000	0.00000	0.00000	0.00000	1.00000

11 FRACTURE

LAYOUT COORDINATES , Z ALONG EXT BEAM,X TOWARD LOCAL WEST

2.5 MRAD BEAM VERSION 280 GEV, RECOMBINED PLUS SINGLE ARM SPECTROMETER

MOMENTUM = 280.000BEV/C BFAC = 1.00000 FACTOR WHICH MULTIPLIES INPUT LENGTHS TO GIVE STANDARD UNITS

RESISTANCE IN MILLIOHMS, X,Z IN FT, Y IN MIL

NO	FLEM	ID(I)	B	T	Q	X	DRIF(I)	ANGL(I)	Z INIT	X INIT	Y INIT	Z CENT	X CENT	THE CEN	B OR G	I	U	POWER
1	TARG	TARG	0	0	0	0	0.00	2.50	0.000	0.0000	0.	0.000	0.0000	0.0	0.00	0.0	0.0	0.0
2	DRIF		0	0	0	0	16.45	0.00	0.000	0.0000	0.	8.225	0.0206	2.5	0.00	0.0	0.0	0.0
3	COLL M6C0		0	0	0	0	8.50	0.00	16.450	0.0411	0.	20.700	0.0517	2.5	0.00	0.0	0.0	0.0
4	DRIF		0	0	0	0	1.50	0.00	24.950	0.0624	0.	25.700	0.0642	2.5	0.00	0.0	0.0	0.0
5	COLL M6C1		0	0	0	0	8.50	0.00	26.450	0.0661	0.	30.700	0.0767	2.5	0.00	0.0	0.0	0.0
6	DRIF		0	0	0	0	1.50	0.00	34.950	0.0874	0.	35.700	0.0892	2.5	0.00	0.0	0.0	0.0
7	COLL M6C2		0	0	0	0	8.50	0.00	36.450	0.0911	0.	40.700	0.1017	2.5	0.00	0.0	0.0	0.0
8	DRIF		0	0	0	0	35.80	0.00	44.950	0.1124	1.	62.850	0.1571	2.5	0.00	0.0	0.0	0.0
9	REND M6B1S		1	0	0	0	10.25	3.26	80.750	0.2019	2.	85.875	0.2210	4.1	9.75	4924.5	40.9	201.5
10	DRIF		1	0	0	0	1.75	0.00	91.020	0.2442	2.	91.875	0.2492	5.8	0.00	0.0	0.0	0.0
11	REND M6B2S		2	0	0	0	10.25	3.26	92.750	0.2543	2.	97.875	0.2901	7.4	9.75	4924.5	40.9	201.5
12	DRIF		2	0	0	0	1.75	0.00	102.999	0.3300	3.	103.874	0.3379	9.0	0.00	0.0	0.0	0.0
13	REND M6B2AS		3	0	0	0	10.25	3.26	104.749	0.3458	3.	109.874	0.3983	10.6	9.75	4924.5	40.9	201.5
14	DRIF		3	0	0	0	8.77	0.00	114.999	0.4550	4.	119.383	0.5088	12.3	0.00	0.0	0.0	0.0
15	TRIM M6V1V		3	1	0	0	2.50	-0.01	123.768	0.5627	4.	125.018	0.5780	12.3	-0.15	-5.9	-1.8	0.0
16	DRIF		3	1	0	0	1.50	0.00	126.268	0.5934	4.	127.018	0.6026	12.3	0.00	0.0	0.0	0.0
17	QUAD M6Q1D		3	1	1	0	10.00	0.00	127.768	0.6118	4.	132.767	0.6732	12.3	-5.34	-113.2	****	17.1
18	DRIF		3	1	1	0	1.50	0.00	137.767	0.7346	4.	138.517	0.7438	12.3	0.00	0.0	0.0	0.0
19	QUAD M6Q1AD		3	1	2	0	5.00	0.00	139.267	0.7530	4.	141.767	0.7837	12.3	-1.81	-38.4	-25.6	1.0
20	DRIF		3	1	2	0	3.50	0.00	144.266	0.8144	3.	146.016	0.8359	12.3	0.00	0.0	0.0	0.0
21	QUAD M6Q2F		3	1	3	0	10.00	0.00	147.766	0.8574	3.	152.766	0.9188	12.3	5.46	115.7	154.5	17.9
22	DRIF		3	1	3	0	1.50	0.00	157.765	0.9802	2.	158.515	0.9894	12.3	0.00	0.0	0.0	0.0
23	REND M6B3		4	1	3	0	20.00	12.50	159.265	0.9986	2.	169.264	1.1683	18.5	19.15	4958.4	35.4	175.5
24	DRIF		4	1	3	0	1.50	0.00	179.262	1.3692	1.	180.012	1.3878	24.8	0.00	0.0	0.0	0.0
25	REND M6B3A		5	1	3	0	20.00	12.50	180.761	1.4063	1.	190.757	1.7010	31.0	19.15	4958.4	35.4	175.5
26	DRIF		5	1	3	0	1.50	0.00	200.752	2.0268	1.	201.501	2.0548	37.3	0.00	0.0	0.0	0.0
27	REND M6B4		6	1	3	0	20.00	12.50	202.251	2.0828	1.	212.242	2.5023	43.5	19.15	4958.4	35.4	175.5
28	DRIF		6	1	3	0	1.50	0.00	222.232	2.9531	0.	222.981	2.9904	49.8	0.00	0.0	0.0	0.0
29	REND M6B5		7	1	3	0	20.00	12.50	223.730	3.0277	0.	233.715	3.5721	56.0	19.15	4958.4	35.4	175.5
30	DRIF		7	1	3	0	1.50	0.00	243.699	4.1477	-0.	244.447	4.1944	62.3	0.00	0.0	0.0	0.0
31	QUAD M6Q3F		7	1	4	0	10.00	0.00	245.196	4.2411	-0.	250.186	4.5523	62.3	5.16	109.4	146.1	16.0
32	DRIF		7	1	4	0	1.50	0.00	255.176	4.8635	-0.	255.925	4.9102	62.3	0.00	0.0	0.0	0.0
33	QUAD M6Q4D		7	1	5	0	10.00	0.00	256.673	4.9568	-0.	261.664	5.2680	62.3	-5.36	-113.7	***	17.3
34	DRIF		7	1	5	0	1.69	0.00	266.654	5.5792	0.	267.497	5.6318	62.3	0.00	0.0	0.0	0.0
35	CONT PUMP		7	1	5	0	0.00	0.00	268.341	5.6844	0.	268.341	5.6844	62.3	0.00	0.0	0.0	0.0
36	DRIF PIPE1		7	1	5	0	140.60	0.00	268.341	5.6844	0.	338.504	10.0599	62.3	0.00	0.0	0.0	0.0
37	DRIF SPACER		7	1	5	0	4.68	0.00	408.668	14.4353	7.	411.004	14.5810	62.3	0.00	0.0	0.0	0.0
38	DRIF PIPE2		7	1	5	0	127.20	0.00	413.339	14.7266	8.	476.816	18.6851	62.3	0.00	0.0	0.0	0.0
39	DRIF M6W1		7	1	5	0	0.00	0.00	540.292	22.6435	24.	540.292	22.6435	62.3	0.00	0.0	0.0	0.0
40	DRIF		7	1	5	0	1.00	0.00	540.292	22.6435	24.	540.791	22.6746	62.3	0.00	0.0	0.0	0.0
41	CONT M6M2		7	1	5	0	0.00	0.00	541.291	22.7058	24.	541.291	22.7058	62.3	0.00	0.0	0.0	0.0
42	DRIF		7	1	5	0	1.42	0.00	541.291	22.7058	24.	541.999	22.7499	62.3	0.00	0.0	0.0	0.0
43	TRIM M6V3H		7	2	5	0	2.50	0.00	542.778	22.7941	24.	543.955	22.8719	62.3	0.00	0.0	0.0	0.0
44	DRIF		7	2	5	0	0.97	0.00	545.273	22.9497	25.	545.687	22.9799	62.3	0.00	0.0	0.0	0.0
45	SLIT M6C3H		7	2	5	0	4.00	0.00	546.171	23.0101	25.	548.167	23.1346	62.3	0.00	0.0	0.0	0.0

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46	DRIF	M6W2	7	2	5	0	0.00	0.00	550.163	23.2591	26.	550.163	23.2591	62.3	0.00	0.0	0.0	0.0
47	DRIF		7	2	5	0	1.18	0.00	550.163	23.2591	26.	550.752	23.2958	62.3	0.00	0.0	0.0	0.0
48	QUAD	M6Q5FL	7	2	6	0	5.00	0.00	551.341	23.3325	26.	553.836	23.4881	62.3	3.49	74.0	49.4	3.7
49	DRIF	M6W3	7	2	6	0	0.00	0.00	556.331	23.6437	27.	556.331	23.6437	62.3	0.00	0.0	0.0	0.0
50	DRIF		7	2	6	0	1.09	0.00	556.331	23.6437	27.	556.875	23.6776	62.3	0.00	0.0	0.0	0.0
51	SLIT	M6C4V	7	2	6	0	4.00	0.00	557.419	23.7116	27.	559.415	23.8360	62.3	0.00	0.0	0.0	0.0
52	DRIF	M6W4	7	2	6	0	0.00	0.00	561.411	23.9605	28.	561.411	23.9605	62.3	0.00	0.0	0.0	0.0
53	DRIF		7	2	6	0	0.80	0.00	561.411	23.9605	28.	561.811	23.9854	62.3	0.00	0.0	0.0	0.0
54	TRIM	M6V4V	7	3	6	0	2.50	-0.01	562.210	24.0103	28.	563.457	24.0881	62.3	-0.15	-5.9	-1.8	0.0
55	DRIF		7	3	6	0	0.72	0.00	564.725	24.1659	28.	565.064	24.1883	62.3	0.00	0.0	0.0	0.0
56	CONT	PIPE3	7	3	6	0	124.80	0.00	565.424	24.2107	28.	627.703	28.0945	62.3	0.00	0.0	0.0	0.0
57	DRIF	SPACER	7	3	6	0	4.68	0.00	689.982	31.9782	37.	692.317	32.1239	62.3	0.00	0.0	0.0	0.0
58	DRIF	PIPE4	7	3	6	0	49.13	0.00	694.653	32.2695	38.	719.170	33.7984	62.3	0.00	0.0	0.0	0.0
59	DRIF		7	3	6	0	4.05	0.00	743.687	35.3274	44.	745.708	35.4534	62.3	0.00	0.0	0.0	0.0
60	TRIM	M6V4AH	7	4	6	0	2.50	0.00	747.730	35.5794	45.	748.977	35.6572	62.3	0.00	0.0	0.0	0.0
61	DRIF		7	4	6	0	1.50	0.00	750.225	35.7350	45.	750.973	35.7817	62.3	0.00	0.0	0.0	0.0
62	TRIM	M6V4BV	7	5	6	0	2.50	-0.01	751.722	35.8284	45.	752.969	35.9062	62.3	-0.07	-2.9	-0.9	0.0
63	DRIF		7	5	6	0	1.50	0.00	754.217	35.9840	45.	754.965	36.0307	62.3	0.00	0.0	0.0	0.0
64	SLIT	M6C4AV	7	5	6	0	6.00	0.00	755.714	36.0773	45.	758.708	36.2641	62.3	0.00	0.0	0.0	0.0
65	DRIF		7	5	6	0	1.50	0.00	761.782	36.4508	46.	762.451	36.4975	62.3	0.00	0.0	0.0	0.0
66	QUAD	M6Q6D	7	5	7	0	10.00	0.00	763.199	36.5441	46.	768.190	36.8553	62.3	-4.42	-93.8	****	11.7
67	DRIF		7	5	7	0	10.30	0.00	773.180	37.1665	47.	778.320	37.4871	62.3	0.00	0.0	0.0	0.0
68	QUAD	M6Q7F	7	5	8	0	10.00	0.00	783.460	37.8076	48.	788.450	38.1188	62.3	4.04	85.7	114.4	9.8
69	DRIF		7	5	8	0	1.50	0.00	793.441	38.4300	49.	794.189	38.4767	62.3	0.00	0.0	0.0	0.0
70	SEXT	M6X5	7	5	8	1	2.50	0.00	794.938	38.5234	49.	796.185	38.6012	62.3	0.00	0.0	0.0	0.0
71	DRIF		7	5	8	1	6.50	0.00	797.433	38.6790	49.	800.677	38.8812	62.3	0.00	0.0	0.0	0.0
72	REND	M6B6	8	5	8	1	20.00	12.19	803.920	39.0835	50.	813.898	39.7515	68.4	18.68	4835.4	34.5	166.9
73	DRIF		8	5	8	1	1.50	0.00	823.874	40.4500	52.	824.622	40.5058	74.5	0.00	0.0	0.0	0.0
74	REND	M6B6A	9	5	8	1	8.00	4.88	825.369	40.5616	52.	829.358	40.8665	76.9	18.69	4839.4	34.5	167.1
75	DRIF		9	5	8	1	1.50	0.00	833.346	41.1762	53.	834.093	41.2357	79.4	0.00	0.0	0.0	0.0
76	SEXT	M6X6	9	5	8	2	2.50	0.00	834.841	41.2951	53.	836.087	41.3942	79.4	0.00	0.0	0.0	0.0
77	DRIF		9	5	8	2	1.50	0.00	837.333	41.4933	53.	838.081	41.5528	79.4	0.00	0.0	0.0	0.0
78	QUAD	M6Q8F	9	5	9	2	10.00	0.00	838.829	41.6122	54.	843.813	42.0085	79.4	4.16	88.2	117.7	10.4
79	DRIF		9	5	9	2	9.40	0.00	848.797	42.4049	55.	853.482	42.7774	79.4	0.00	0.0	0.0	0.0
80	CONT	SPACER	9	5	9	2	1.75	0.00	858.167	43.1500	56.	859.040	43.2193	79.4	0.00	0.0	0.0	0.0
81	DRIF		9	5	9	2	0.75	0.00	859.912	43.2887	56.	860.286	43.3184	79.4	0.00	0.0	0.0	0.0
82	QUAD	M6Q9D	9	5	10	2	10.00	0.00	860.660	43.3481	56.	865.644	43.7445	79.4	-4.42	-93.7	****	11.7
83	DRIF		9	5	10	2	5.50	0.00	870.628	44.1408	58.	873.369	44.3588	79.4	0.00	0.0	0.0	0.0
84	TRIM	M6V5H	9	6	10	2	2.50	0.00	876.111	44.5768	59.	877.357	44.6759	79.4	0.00	0.0	0.0	0.0
85	DRIF		9	6	10	2	1.50	0.00	878.623	44.7749	59.	879.351	44.8344	79.4	0.00	0.0	0.0	0.0
86	TRIM	M6V6V	9	7	10	2	2.50	-0.01	880.098	44.8938	59.	881.344	44.9929	79.4	-0.09	-3.4	-1.0	0.0
87	DRIF		9	7	10	2	92.29	0.00	882.590	45.0920	59.	928.590	48.7498	79.4	0.00	0.0	0.0	0.0
88	QUAD	M6Q10A	9	7	11	2	10.00	0.00	974.590	52.4075	68.	979.574	52.8039	79.4	3.99	84.5	112.8	9.5
89	DRIF		9	7	11	2	30.58	0.00	984.559	53.2002	69.	999.800	54.4122	79.4	0.00	0.0	0.0	0.0
90	TRIM	M6V7H	9	8	11	2	2.50	0.00	1015.042	55.6242	73.	1016.288	55.7233	79.4	0.00	0.0	0.0	0.0
91	DRIF	M6W5	9	8	11	2	0.00	0.00	1017.534	55.8224	73.	1017.534	55.8224	79.4	0.00	0.0	0.0	0.0
92	DRIF		9	8	11	2	1.00	0.00	1017.534	55.8224	73.	1018.033	55.8620	79.4	0.00	0.0	0.0	0.0
93	CONT	M6M3	9	8	11	2	0.00	0.00	1018.531	55.9016	73.	1018.531	55.9016	79.4	0.00	0.0	0.0	0.0
94	DRIF		9	8	11	2	1.50	0.00	1018.531	55.9016	73.	1019.279	55.9611	79.4	0.00	0.0	0.0	0.0
95	SLIT	M6C5V	9	8	11	2	4.00	0.00	1020.027	56.0205	74.	1022.020	56.1791	79.4	0.00	0.0	0.0	0.0

96 DRIF M6W6	9	8	11	2	0.00	0.00	1024.014	56,3376	74.	1024.014	56,3376	79.4	0.00	0.0	0.0	0.0
97 DRIF	9	8	11	2	1.50	0.00	1024.014	56,3376	74.	1024.762	56,3970	79.4	0.00	0.0	0.0	0.0
98 QUAD M6Q10	9	8	12	2	10.00	0.00	1025.509	56,4565	74.	1030.494	56,8528	79.4	2.95	62.5	83.5	5.2
99 DRIF M6W7	9	8	12	2	0.00	0.00	1035.478	57,2492	76.	1035.478	57,2492	79.4	0.00	0.0	0.0	0.0
100 DRIF	9	8	12	2	1.23	0.00	1035.478	57,2492	76.	1036.091	57,2979	79.4	0.00	0.0	0.0	0.0
101 CONT M6BT1	9	8	12	2	0.20	0.00	1036.724	57,3467	76.	1036.804	57,3546	79.4	0.00	0.0	0.0	0.0
102 DRIF	9	8	12	2	1.40	0.00	1036.903	57,3625	76.	1037.601	57,4180	79.4	0.00	0.0	0.0	0.0
103 CONT HOD1X	9	8	12	2	0.00	0.00	1038.299	57,4735	76.	1038.299	57,4735	79.4	0.00	0.0	0.0	0.0
104 DRIF	9	8	12	2	1.00	0.00	1038.299	57,4735	76.	1038.797	57,5131	79.4	0.00	0.0	0.0	0.0
105 SLIT M6C6H	9	8	12	2	4.00	0.00	1039.296	57,5527	77.	1041.289	57,7113	79.4	0.00	0.0	0.0	0.0
106 DRIF	9	8	12	2	1.50	0.00	1043.283	57,8698	77.	1044.031	57,9293	79.4	0.00	0.0	0.0	0.0
107 TRIM M6V8V	9	9	12	2	2.50	-0.01	1044.778	57,9887	77.	1046.025	58,0878	79.4	-2.09	-3.4	-1.0	0.0
108 DRIF	9	9	12	2	1.50	0.00	1047.271	58,1869	78.	1048.018	58,2463	79.4	0.00	0.0	0.0	0.0
109 CERK M6K2	9	9	12	2	60.00	0.00	1048.766	58,3058	78.	1078.671	60,6838	79.4	0.00	0.0	0.0	0.0
110 DRIF M6W8	9	9	12	2	0.00	0.00	1108.577	63,0618	83.	1108.577	63,0618	79.4	0.00	0.0	0.0	0.0
111 DRIF	9	9	12	2	3.90	0.00	1108.577	63,0618	83.	1110.521	63,2164	79.4	0.00	0.0	0.0	0.0
112 TRIM M6V9V	9	10	12	2	2.50	-0.01	1112.465	63,3709	84.	1113.711	63,4700	79.4	-0.10	-4.1	-1.2	0.0
113 DRIF	9	12	12	2	1.75	0.00	1114.957	63,5691	84.	1115.829	63,6384	79.4	0.00	0.0	0.0	0.0
114 TRIM M6V10H	9	11	12	2	2.50	0.00	1116.721	63,7078	84.	1117.947	63,8069	79.4	0.00	0.0	0.0	0.0
115 DRIF	9	11	12	2	1.75	0.00	1119.194	63,9060	84.	1120.066	63,9753	79.4	0.00	0.0	0.0	0.0
116 QUAD M6Q12D	9	11	13	2	10.00	0.00	1120.938	64,0447	84.	1125.922	64,4410	79.4	-5.00	-106.1	****	15.0
117 DRIF	9	11	13	2	2.00	0.00	1130.907	64,8374	84.	1131.903	64,9166	79.4	0.00	0.0	0.0	0.0
118 QUAD M6Q11D	9	11	14	2	5.00	0.00	1132.900	64,9959	84.	1135.392	65,1941	79.4	-5.55	-117.6	-78.5	9.2
119 DRIF	9	11	14	2	9.29	0.00	1137.885	65,3922	84.	1142.513	65,7602	79.4	0.00	0.0	0.0	0.0
120 QUAD M6Q13F	9	11	15	2	10.00	0.00	1147.141	66,1283	85.	1152.125	66,5246	79.4	2.53	53.7	71.7	3.9
121 DRIF	9	11	15	2	1.50	0.00	1157.109	66,9209	85.	1157.857	66,9804	79.4	0.00	0.0	0.0	0.0
122 REND M6B7	10	11	15	2	20.00	-12.19	1158.625	67,0398	85.	1168.577	67,7869	73.3	-18.68	-4835.4	-34.5	166.9
123 DRIF	10	11	15	2	1.50	0.00	1178.551	68,5036	86.	1179.299	68,5539	67.2	0.00	0.0	0.0	0.0
124 REND M6B8	11	11	15	2	20.00	-12.19	1180.048	68,6043	86.	1190.028	69,2298	61.1	-18.68	-4835.4	-34.5	166.9
125 DRIF	11	11	15	2	1.50	0.00	1200.010	69,8248	87.	1200.759	69,8660	55.0	0.00	0.0	0.0	0.0
126 REND M6B9	12	11	15	2	20.00	-12.19	1201.598	69,9772	87.	1211.495	70,4110	48.9	-18.68	-4835.4	-34.5	166.9
127 DRIF	12	11	15	2	1.50	0.00	1221.484	70,8843	88.	1222.234	70,9164	42.8	0.00	0.0	0.0	0.0
128 REND M6B9A	13	11	15	2	20.00	-12.19	1222.983	70,9485	89.	1232.976	71,5305	36.7	-18.68	-4835.4	-34.5	166.9
129 DRIF	13	11	15	2	1.50	0.00	1242.969	71,6820	90.	1243.719	71,7050	30.6	0.00	0.0	0.0	0.0
130 REND M6B9B	14	11	15	2	20.00	-12.19	1244.469	71,7279	90.	1254.465	71,9881	24.5	-18.68	-4835.4	-34.5	166.9
131 DRIF	14	11	15	2	1.50	0.00	1264.463	72,2178	92.	1265.213	72,2316	18.4	0.00	0.0	0.0	0.0
132 REND M6B10	15	11	15	2	20.00	-12.19	1265.962	72,2454	92.	1275.962	72,3836	12.3	-18.68	-4835.4	-34.5	166.9
133 DRIF	15	11	15	2	1.50	0.00	1285.961	72,4915	94.	1286.711	72,4961	6.2	0.00	0.0	0.0	0.0
134 REND M6B11	16	11	15	2	20.00	-12.19	1287.461	72,5008	94.	1297.461	72,5172	0.1	-18.68	-4835.4	-34.5	166.9
135 DRIF M6W9	16	11	15	2	0.00	0.00	1307.461	72,5031	97.	1307.461	72,5031	-6.0	0.00	0.0	0.0	0.0
136 DRIF	16	11	15	2	5.00	0.00	1307.461	72,5031	97.	1309.961	72,4881	-6.0	0.00	0.0	0.0	0.0
137 CERK M6K3D	16	11	15	2	18.50	0.00	1312.461	72,4732	97.	1321.711	72,4179	-6.0	0.00	0.0	0.0	0.0
138 DRIF	16	11	15	2	1.50	0.00	1330.960	72,3625	100.	1331.710	72,3581	-6.0	0.00	0.0	0.0	0.0
139 CERK M6K4D	16	11	15	2	18.50	0.00	1332.460	72,3536	100.	1341.710	72,2983	-6.0	0.00	0.0	0.0	0.0
140 DRIF M6W10	16	11	15	2	0.00	0.00	1350.960	72,2429	103.	1350.960	72,2429	-6.0	0.00	0.0	0.0	0.0
141 DRIF	16	11	15	2	3.82	0.00	1350.960	72,2429	103.	1352.870	72,2315	-6.0	0.00	0.0	0.0	0.0
142 QUAD M6Q14F	16	11	16	2	10.00	0.00	1354.780	72,2201	103.	1359.780	72,1902	-6.0	3.30	70.0	93.5	6.5
143 DRIF	16	11	16	2	1.25	0.00	1364.780	72,1603	105.	1365.405	72,1566	-6.0	0.00	0.0	0.0	0.0
144 QUAD M6Q15F	16	11	17	2	10.00	0.00	1366.030	72,1528	105.	1371.030	72,1229	-6.0	3.30	70.0	93.5	6.5
145 DRIF	16	11	17	2	1.25	0.00	1376.030	72,0930	106.	1376.655	72,0893	-6.0	0.00	0.0	0.0	0.0

146	QUAD	M6Q16D	16	11	18	2	10.00	0.00	1377.280	72.0855	107.	1382.280	72.0556	-6.0	-4.24	-89.8	****	10.8
147	DRIF		16	11	18	2	1.25	0.00	1387.279	72.0257	108.	1387.904	72.0220	-6.0	0.00	0.0	0.0	0.0
148	QUAD	M6Q17D	16	11	19	2	10.00	0.00	1388.529	72.0183	109.	1393.529	71.9884	-6.0	-4.24	-89.8	****	10.8
149	DRIF	M6W11	16	11	19	2	0.00	0.00	1398.529	71.9585	110.	1398.529	71.9585	-6.0	0.00	0.0	0.0	0.0
150	DRIF		16	11	19	2	0.63	0.00	1398.529	71.9585	110.	1398.842	71.9566	-6.0	0.00	0.0	0.0	0.0
151	CONT	HOD2XY	16	11	19	2	2.50	0.00	1399.154	71.9547	110.	1400.404	71.9473	-6.0	0.00	0.0	0.0	0.0
152	DRIF	M6W12	16	11	19	2	0.00	0.00	1401.654	71.9398	111.	1401.654	71.9398	-6.0	0.00	0.0	0.0	0.0
153	DRIF		16	11	19	2	0.88	0.00	1401.654	71.9398	111.	1402.092	71.9372	-6.0	0.00	0.0	0.0	0.0
154	TRIM	M6V11H	16	12	19	2	2.50	0.00	1402.529	71.9346	111.	1403.779	71.9271	-6.0	0.00	0.0	0.0	0.0
155	DRIF		16	12	19	2	1.00	0.00	1405.029	71.9196	111.	1405.529	71.9166	-6.0	0.00	0.0	0.0	0.0
156	TRIM	M6AVB1	16	13	19	2	10.00	-0.01	1406.029	71.9136	112.	1411.029	71.8837	-6.0	-0.03	-1.2	-0.4	0.0
157	DRIF		16	13	19	2	17.88	0.00	1416.029	71.8538	113.	1424.966	71.8004	-6.0	0.00	0.0	0.0	0.0
158	TRIM	M6AVB2	16	14	19	2	20.00	0.00	1433.924	71.7469	114.	1443.903	71.6871	-6.0	0.00	0.0	0.0	0.0
159	DRIF	M6W13	16	14	19	2	0.00	0.00	1453.923	71.6273	116.	1453.903	71.6273	-6.0	0.00	0.0	0.0	0.0
160	DRIF		16	14	19	2	0.67	0.00	1453.923	71.6273	116.	1454.237	71.6253	-6.0	0.00	0.0	0.0	0.0
161	CONT	HOD3XY	16	14	19	2	1.67	0.00	1454.570	71.6233	116.	1455.404	71.6184	-6.0	0.00	0.0	0.0	0.0
162	DRIF		16	14	19	2	0.15	0.00	1456.237	71.6134	116.	1456.310	71.6129	-6.0	0.00	0.0	0.0	0.0
163	CONT	BT2	16	14	19	2	0.38	0.00	1456.383	71.6125	116.	1456.571	71.6114	-6.0	0.00	0.0	0.0	0.0
164	DRIF	M6W14	16	14	19	2	0.00	0.00	1456.758	71.6103	116.	1456.758	71.6103	-6.0	0.00	0.0	0.0	0.0
165	DRIF		16	14	19	2	0.85	0.00	1456.758	71.6103	116.	1457.185	71.6077	-6.0	0.00	0.0	0.0	0.0
166	TRIM	M6AVB3	16	15	19	2	10.00	0.00	1457.612	71.6052	116.	1462.612	71.5753	-6.0	0.00	0.0	0.0	0.0
167	DRIF	M6W15	16	15	19	2	0.00	0.00	1467.612	71.5454	117.	1467.612	71.5454	-6.0	0.00	0.0	0.0	0.0
168	DRIF		16	15	19	2	0.83	0.00	1467.612	71.5454	117.	1468.029	71.5429	-6.0	0.00	0.0	0.0	0.0
169	CONT	BTNOT	16	15	19	2	0.38	0.00	1468.445	71.5404	117.	1468.633	71.5393	-6.0	0.00	0.0	0.0	0.0
170	DRIF		16	15	19	2	0.08	0.00	1468.820	71.5381	117.	1468.862	71.5379	-6.0	0.00	0.0	0.0	0.0
171	CONT	TARGET	16	15	19	2	2.25	0.00	1468.923	71.5376	117.	1470.028	71.5309	-6.0	0.00	0.0	0.0	0.0
172	DRIF		16	15	19	2	0.25	0.00	1471.153	71.5242	117.	1471.278	71.5234	-6.0	0.00	0.0	0.0	0.0
173	CONT	SASW1	16	15	19	2	0.00	0.00	1471.423	71.5227	117.	1471.403	71.5227	-6.0	0.00	0.0	0.0	0.0
174	DRIF		16	15	19	2	0.50	0.00	1471.423	71.5227	117.	1471.653	71.5212	-6.0	0.00	0.0	0.0	0.0
175	TRIM	SASV1H	16	16	19	2	2.50	0.00	1471.903	71.5197	117.	1473.153	71.5122	-6.0	0.00	0.0	0.0	0.0
176	DRIF		16	16	19	2	8.02	0.00	1474.403	71.5047	118.	1478.415	71.4808	-6.0	0.00	0.0	0.0	0.0
177	SLIT	DUMP	16	16	19	2	2.00	0.00	1482.428	71.4568	118.	1483.428	71.4508	-6.0	0.00	0.0	0.0	0.0
178	DRIF		16	16	19	2	2.00	0.00	1484.428	71.4448	119.	1485.428	71.4388	-6.0	0.00	0.0	0.0	0.0
179	QUAD	SASQ1A	16	16	20	2	10.00	0.00	1486.428	71.4328	119.	1491.428	71.4029	-6.0	7.05	149.5	199.5	29.8
180	DRIF		16	16	20	2	4.90	0.00	1496.428	71.3730	120.	1498.877	71.3584	-6.0	0.00	0.0	0.0	0.0
181	QUAD	SASQ2A	16	15	21	2	10.00	0.00	1501.327	71.3437	121.	1506.327	71.3138	-6.0	-6.89	-146.1	****	28.5
182	DRIF		16	15	21	2	4.90	0.00	1511.327	71.2839	122.	1513.777	71.2693	-6.0	0.00	0.0	0.0	0.0
183	QUAD	SASQ2B	16	16	22	2	5.00	0.00	1516.227	71.2546	122.	1518.727	71.2397	-6.0	-6.89	-146.1	-97.6	14.3
184	DRIF		16	16	22	2	4.90	0.00	1521.227	71.2247	123.	1523.677	71.2101	-6.0	0.00	0.0	0.0	0.0
185	QUAD	SASQ2C	16	16	23	2	5.00	0.00	1526.127	71.1954	124.	1528.627	71.1805	-6.0	-6.89	-146.1	-97.6	14.3
186	DRIF		16	16	23	2	4.90	0.00	1531.127	71.1655	124.	1533.577	71.1509	-6.0	0.00	0.0	0.0	0.0
187	QUAD	SASQ1B	16	16	24	2	10.00	0.00	1536.027	71.1362	125.	1541.027	71.1063	-6.0	7.05	149.5	199.5	29.8
188	DRIF		16	16	24	2	2.50	0.00	1546.027	71.0764	126.	1547.277	71.0690	-6.0	0.00	0.0	0.0	0.0
189	REND	SASB1	17	16	24	2	10.00	-6.30	1548.527	71.0615	127.	1553.526	71.0198	-9.1	-19.30	-4998.0	-17.8	89.1
190	DRIF		17	16	24	2	47.20	0.00	1558.526	70.9702	128.	1582.124	70.6804	-12.3	0.00	0.0	0.0	0.0
191	QUAD	SASQ3A	17	16	25	2	5.00	0.00	1605.723	70.3906	136.	1608.222	70.3599	-12.3	7.12	151.0	100.8	15.2
192	DRIF		17	16	25	2	6.60	0.00	1610.722	70.3292	137.	1614.022	70.2887	-12.3	0.00	0.0	0.0	0.0
193	QUAD	SASQ4A	17	16	26	2	5.00	0.00	1617.322	70.2481	138.	1619.822	70.2174	-12.3	-6.94	-147.2	-98.2	14.5
194	DRIF		17	16	26	2	4.90	0.00	1622.321	70.1867	139.	1624.771	70.1567	-12.3	0.00	0.0	0.0	0.0
195	QUAD	SASQ4B	17	16	27	2	5.00	0.00	1627.221	70.1266	140.	1629.721	70.0959	-12.3	-6.94	-147.2	-98.2	14.5

196	DRIF	17	16	27	2	.6,60	0,00	1632,221	70,0652	141,	1635,520	70,0246	-12,3	0,00	0,0	0,0	0,0	
197	QUAD	SASQ3B	17	16	28	2	5,00	0,00	1638,820	69,9841	142,	1641,320	69,9534	-12,3	7,12	151,0	100,8	15,2
198	DRIF	17	16	28	2	1,00	0,00	1643,820	69,9227	143,	1644,320	69,9166	-12,3	0,00	0,0	0,0	0,0	
199	CONT	SASW4	17	16	28	2	0,00	0,00	1644,820	69,9104	143,	1644,820	69,9104	-12,3	0,00	0,0	0,0	0,0
200	DRIF	17	16	28	2	0,30	0,00	1644,820	69,9104	143,	1644,970	69,9086	-12,3	0,00	0,0	0,0	0,0	
201	CONT	PWCV1	17	16	28	2	0,60	0,00	1645,120	69,9068	143,	1645,420	69,9031	-12,3	0,00	0,0	0,0	0,0
202	DRIF	17	16	28	2	0,50	0,00	1645,720	69,8994	143,	1645,970	69,8963	-12,3	0,00	0,0	0,0	0,0	
203	CONT	SASW5	17	16	28	2	0,00	0,00	1646,220	69,8933	143,	1646,220	69,8933	-12,3	0,00	0,0	0,0	0,0
204	DRIF	17	16	28	2	0,80	0,00	1646,220	69,8933	143,	1646,620	69,8883	-12,3	0,00	0,0	0,0	0,0	
205	REND	SASB2A	18	16	28	2	20,00	-12,60	1647,020	69,8834	144,	1657,018	69,7134	-18,6	-19,30	-4998,0	-35,7	178,3
206	DRIF	18	16	28	2	2,50	0,00	1667,016	69,5119	148,	1668,266	69,4808	-24,9	0,00	0,0	0,0	0,0	
207	REND	SASB2B	19	16	28	2	20,00	-12,60	1669,515	69,4497	148,	1679,511	69,1537	-31,2	-19,30	-4998,0	-35,7	178,3
208	DRIF	19	16	28	2	2,50	0,00	1689,526	68,8262	153,	1690,755	68,7793	-37,5	0,00	0,0	0,0	0,0	
209	REND	SASB2C	20	16	28	2	20,00	-12,60	1692,024	68,7325	153,	1701,995	68,3106	-43,8	-19,30	-4998,0	-35,7	178,3
210	DRIF	20	16	28	2	2,50	0,00	1711,985	67,8572	158,	1713,233	67,7946	-50,1	0,00	0,0	0,0	0,0	
211	REND	SASB2D	21	16	28	2	20,00	-12,60	1714,482	67,7320	158,	1724,467	67,1842	-56,4	-19,30	-4998,0	-35,7	178,3
212	DRIF	21	16	28	2	1,80	0,00	1734,450	66,6050	163,	1735,348	66,5486	-62,7	0,00	0,0	0,0	0,0	
213	CONT	SASW6	21	16	28	2	0,00	0,00	1736,246	66,4923	164,	1736,246	66,4923	-62,7	0,00	0,0	0,0	0,0
214	DRIF	21	16	28	2	0,50	0,00	1736,246	66,4923	164,	1736,496	66,4766	-62,7	0,00	0,0	0,0	0,0	
215	CONT	PWCH1	21	16	28	2	0,60	0,00	1736,745	66,4609	164,	1737,045	66,4422	-62,7	0,00	0,0	0,0	0,0
216	DRIF	21	16	28	2	1,00	0,00	1737,344	66,4234	164,	1737,843	66,3920	-62,7	0,00	0,0	0,0	0,0	
217	CONT	ST1	21	16	28	2	0,20	0,00	1738,342	66,3607	164,	1738,442	66,3545	-62,7	0,00	0,0	0,0	0,0
218	DRIF	21	16	28	2	3,45	0,00	1738,542	66,3482	164,	1740,263	66,2401	-62,7	0,00	0,0	0,0	0,0	
219	CERK	SGAS1	21	16	28	2	105,00	0,00	1741,985	66,1321	165,	1794,382	62,8435	-62,7	0,00	0,0	0,0	0,0
220	DRIF	21	16	28	2	1,40	0,00	1846,779	59,5550	194,	1847,477	59,5111	-62,7	0,00	0,0	0,0	0,0	
221	CONT	PWCH2	21	16	28	2	0,60	0,00	1848,176	59,4673	195,	1848,475	59,4485	-62,7	0,00	0,0	0,0	0,0
222	DRIF	21	16	28	2	0,40	0,00	1848,775	59,4297	195,	1848,974	59,4172	-62,7	0,00	0,0	0,0	0,0	
223	CONT	PWCV2	21	16	28	2	0,60	0,00	1849,174	59,4047	195,	1849,473	59,3859	-62,7	0,00	0,0	0,0	0,0
224	DRIF	21	16	28	2	0,40	0,00	1849,773	59,3671	195,	1849,972	59,3546	-62,7	0,00	0,0	0,0	0,0	
225	CONT	PWC45	21	16	28	2	0,60	0,00	1850,172	59,3420	195,	1850,471	59,3232	-62,7	0,00	0,0	0,0	0,0
226	DRIF	21	16	28	2	2,96	0,00	1850,771	59,3044	196,	1852,248	59,2117	-62,7	0,00	0,0	0,0	0,0	
227	CERK	SGAS2	21	16	28	2	48,00	0,00	1853,725	59,1190	197,	1877,678	57,6157	-62,7	0,00	0,0	0,0	0,0
228	DRIF	21	16	28	2	2,50	0,00	1901,631	56,1124	212,	1902,878	56,0341	-62,7	0,00	0,0	0,0	0,0	
229	CERK	SGAS3	21	16	28	2	24,00	0,00	1904,126	55,9558	213,	1916,102	55,2041	-62,7	0,00	0,0	0,0	0,0
230	DRIF	21	16	28	2	2,63	0,00	1928,079	54,4524	222,	1929,391	54,3701	-62,7	0,00	0,0	0,0	0,0	
231	CONT	PWCH3	21	16	28	2	0,60	0,00	1930,704	54,2877	223,	1931,003	54,2689	-62,7	0,00	0,0	0,0	0,0
232	DRIF	21	16	28	2	0,40	0,00	1931,302	54,2501	223,	1931,502	54,2376	-62,7	0,00	0,0	0,0	0,0	
233	CONT	PWCV3	21	16	28	2	0,60	0,00	1931,702	54,2250	223,	1932,001	54,2063	-62,7	0,00	0,0	0,0	0,0
234	DRIF	21	16	28	2	0,50	0,00	1932,300	54,1875	223,	1932,550	54,1718	-62,7	0,00	0,0	0,0	0,0	
235	CONT	ST2	21	16	28	2	0,20	0,00	1932,799	54,1561	223,	1932,899	54,1499	-62,7	0,00	0,0	0,0	0,0
236	DRIF	21	16	28	2	1,00	0,00	1932,999	54,1436	223,	1933,498	54,1123	-62,7	0,00	0,0	0,0	0,0	
237	CONT	SHW	21	16	28	2	0,50	0,00	1933,997	54,0810	224,	1934,247	54,0653	-62,7	0,00	0,0	0,0	0,0
238	DRIF	21	16	28	2	5,93	0,00	1934,496	54,0497	224,	1937,455	53,8639	-62,7	0,00	0,0	0,0	0,0	
239	CONT	STA	21	16	28	2	12,00	0,00	1940,414	53,6782	226,	1946,403	53,3024	-62,7	0,00	0,0	0,0	0,0
240	DRIF	21	16	28	2	12,50	0,00	1952,391	52,9265	230,	1958,629	52,5350	-62,7	0,00	0,0	0,0	0,0	
241	CONT	DOOR	21	16	28	2	0,00	0,00	1964,866	52,1436	235,	1964,866	52,1436	-62,7	0,00	0,0	0,0	0,0
ELEM NO	POWER		STAN	WID		STAN LEN		STAN CUR		STAN RES								
BEND 21	3610,8070		2,0800			20,0000		258,9000		7,1370								
QUAD 28	370,0195		1,4200			10,0000		21,2000		1335,0000								
SEXT 2	0,0000		2,0800			2,5000		100,0000		1,0000								
TRIM 16	0,0360		1,3020			2,5000		40,0000		300,0000								

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2254  
IM-4 //

- 30 -

TM-477  
2254

TOTAL LENGTH = 1967.81FT      TOTAL BEND = -62,68 MRAD      TOTAL POWER = 3980,86KW